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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/640,082	08/13/2003	Chang-Hyun Lee	5649-1145	7917
20792	7590	03/17/2005	EXAMINER	
MYERS BIGEL SIBLEY & SAJOVEC			NGUYEN, TAN	
PO BOX 37428			ART UNIT	
RALEIGH, NC 27627			PAPER NUMBER	
			2827	

DATE MAILED: 03/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/640,082

Applicant(s)

LEE, CHANG-HYUN

Examiner

Tan T. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-80 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-25 and 38-80 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 5, 26, 27, 29 and 30 is/are rejected.
- 7) ☒ Claim(s) 3, 6-12, 28 and 31-37 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>08/03</u> . | 6) <input type="checkbox"/> Other: ____ |

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.
2. The Information Disclosure Statement submitted by Applicant on August 13, 2003 has been received and fully considered.
3. The disclosure is objected to because of the following informalities:

In page 15, line 8, should "WL12" and ""WL14" be changed to --WL13-- and --WL15--. In page 15, line 9, should "WL13" and "WL11" be changed to --WL14-- and --WL12--.

Appropriate correction is required.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2, 4, 26-27 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Hu (U.S. Patent No. 5,715,194).

Hu disclosed in Fig. 5 a method of programming a NAND flash memory having a voltage of 9V applied to a first word line [304], a second voltage of 2V applied to second word lines [306a] and [306b], and a program voltage of 18V applied to the third (selected) word line [308] (column 5, lines 45-50 and lines 55-59). The 9V voltage would be considered as the claimed pass voltage, the 2V voltage would be considered as the coupling voltage and the 18V would be considered as claimed program voltage. Although Hu did not disclosed the 18V is applied to the selected word line while the 9V

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and 2V are applied to the other word lines, it is inherent that to yield the maximum effect of the applied voltages, the 18V, 2V and 9V are simultaneously applied to the selected (third) word line, the adjacent word lines to the selected word line (second word lines) and the word lines (first) next to the word lines adjacent the selected word lines, respectively.

Regarding claim 26, Hu did not disclosed the claimed row selection circuit, but to perform the programming method in Fig. 5, Hu inherently disclosed a row decoder or a word line driver that is capable of generating the appropriate voltages to apply to the respective word lines.

Regarding claims 2 and 27, the claimed fourth word line is understood as the non-selected word line that three word lines apart from the selected word lines, as shown in Fig. 5 that except the two word lines [306a] and [306b] that are adjacent to the selected word lines, the other non-selected word lines are applied with the 9V voltage.

Regarding claims 4 and 29, since the program voltage is 18V, it is inherent that the floating gate devices [104i-104k] are one bit memory cells.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 5 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hu.

See description of Hu in paragraph 5, *supra*. Hu did not disclose the floating gate devices in Fig. 5 are multi-bit memory cells.

It is known in the art that memory devices using multi-bit memory cells instead of single bit memory cells.

It would have been obvious to a person of ordinary skill in the art at the time the invention made to modify the memory device of Hu by replacing the single bit memory cells with the multi-bit memory cells.

The rationale is as follows: A person of ordinary skill in the art would have been motivated to use the multi-bit memory cells in place of the single bit memory cells to increase the storage capacity without increasing the overall dimension of the memory device.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kwon and Lin are cited to show different method of programming without disturbing the adjacent cells.

9. Claims 3, 6-12, 28, 31-37 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Claims 13-25, 38-80 are allowed.

11. The following is an examiner's statement of reasons for allowance:

The prior art failed to show or suggest the limitation of the decoupling voltage applied to the fourth word line, wherein the decoupling voltage is less than the pass

voltage, the coupling voltage and the program voltage as claimed in claims 6-10, 31-35. The prior art did not show or suggest the limitation of the coupling voltage is greater than the decoupling voltage as in claims 13-25, 38-59. The prior art failed to show or suggest the limitation of charging the channel of the memory cell to be programmed with a first voltage and a channel of the memory cell transistor to be program-inhibited with a second voltage as in claims 60-80. The prior art failed to show or suggest the limitation of before applying the program voltage, precharging the channel of the memory cell transistors with first and second precharge voltages as in claims 11-12 and 36-37.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tan T. Nguyen whose telephone number is (571) 272-1789. The examiner can normally be reached on Monday to Friday from 07:00 AM to 03:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoai Ho, can be reached at (571) 272-1777. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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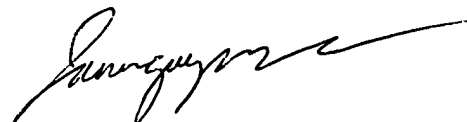
published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).



Tan T. Nguyen
Primary Examiner
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March 11, 2005